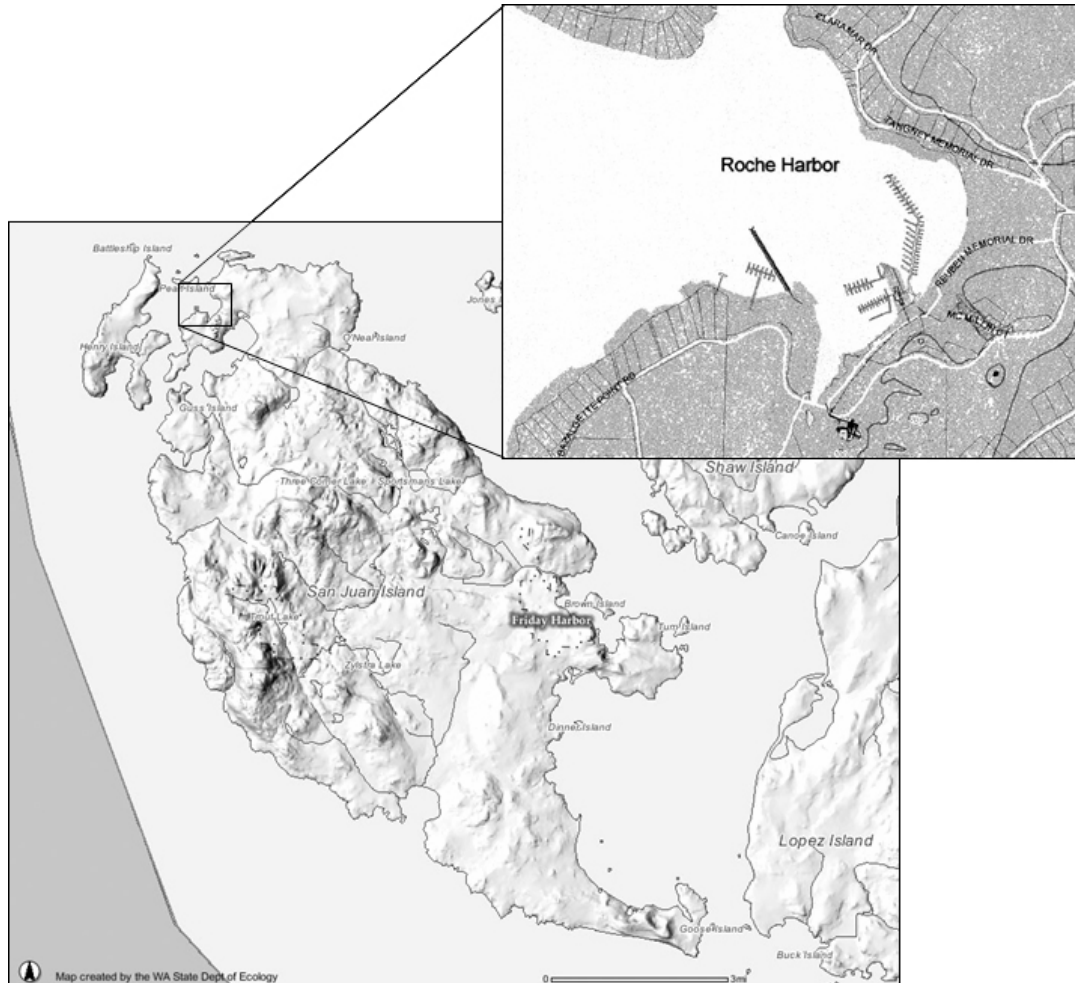


FACT SHEET FOR NPDES PERMIT WA-002182-2

ROCHE HARBOR RESORT WASTEWATER TREATMENT PLANT



SUMMARY

This fact sheet is a companion document to the draft National Pollutant Discharge Elimination System (NPDES) Permit for the Roche Harbor Resort Wastewater Treatment Plant (WWTP). The fact sheet explains the nature of the proposed discharges, the Department of Ecology's (the Department's) decisions on limiting the pollutants in the waste water, and the regulatory and technical basis for those decisions. The fact sheet and draft permit are available for review (see [Appendix A--Public Involvement](#) for more detail on the public notice procedures).

TABLE OF CONTENTS

INTRODUCTION	4
BACKGROUND INFORMATION	5
DESCRIPTION OF THE FACILITY	5
History.....	5
Collection System Status	5
Treatment Processes.....	5
Discharge Outfall	7
Residual Solids.....	7
PERMIT STATUS.....	7
SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT	7
WASTEWATER CHARACTERIZATION	8
PROPOSED PERMIT LIMITATIONS.....	9
DESIGN CRITERIA	9
TECHNOLOGY-BASED EFFLUENT LIMITATIONS	10
SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS	11
Numerical Criteria for the Protection of Aquatic Life.....	11
Numerical Criteria for the Protection of Human Health.....	11
Narrative Criteria	11
Antidegradation.....	12
Description of the Receiving Water.....	12
Surface Water Quality Criteria	12
Mixing Zones	13
Critical Conditions	13
Consideration of Surface Water Quality-based Limits for Numeric Criteria	14
Whole Effluent Toxicity	15
Human Health	16
Sediment Quality	16
GROUND WATER QUALITY LIMITATIONS.....	16
COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT.....	16
MONITORING REQUIREMENTS	17
LAB ACCREDITATION	17
OTHER PERMIT CONDITIONS	17
REPORTING AND RECORDKEEPING	17
PREVENTION OF FACILITY OVERLOADING	17
OPERATION AND MAINTENANCE (O&M).....	18
RESIDUAL SOLIDS HANDLING.....	18
PRETREATMENT	18
Duty to Enforce Discharge Prohibitions	18
Development of Best Management Practices	19
Requirements for Routine Identification of Potential Sources of Prohibited Discharges.....	19

PLANT SAFTEY AUDIT	19
GENERAL CONDITIONS	19
PERMIT ISSUANCE PROCEDURES	20
PERMIT MODIFICATIONS	20
RECOMMENDATION FOR PERMIT ISSUANCE	20
REFERENCES FOR TEXT AND APPENDICES.....	21
APPENDIX A—PUBLIC INVOLVEMENT INFORMATION.....	22
APPENDIX B—GLOSSARY	23
APPENDIX C—TECHNICAL CALCULATIONS.....	28
APPENDIX D—RESPONSE TO COMMENTS	29
APPENDIX E—DMR SUMMARY DATA	30
APPENDIX F—OUTFALL DILLUTION ANALYSIS	38
Mixing Zone Size.....	38
Dilution Modeling, Outfall #001	39

INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), technical criteria for discharges from municipal wastewater treatment facilities (Chapter 173-221 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the State is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty (30) days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see [Appendix A—Public Involvement](#) of the fact sheet for more detail on the public notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in [Appendix D—Response to Comments](#).

GENERAL INFORMATION	
Applicant	Roche Harbor Resort
Facility Name and Address	Roche Harbor Wastewater Treatment Plant 9711 Roche Harbor Road Friday Harbor, WA 98250
Type of Treatment	Extended aeration with polishing lagoon
Discharge Location	Roche Harbor (Haro Strait/Pacific Ocean) Latitude: 48° 36' 35" N Longitude: 123° 09' 29" W
Water Body ID Number	1224026474620 (new ID number) WA-02-0020 (old ID number)

BACKGROUND INFORMATION

DESCRIPTION OF THE FACILITY

The Roche Harbor Wastewater Treatment Plant is a privately-owned facility located at the Roche Harbor Resort on the northwest tip of San Juan Island. Established in the 1880s as a lime quarry and processing factory, the area began a transformation into a resort community in the late 1950s. Since that time, the community has evolved into a destination resort village comprised of a historic hotel, luxury suit condominiums, cottages, and boat slips. Future plans include the addition of privately-owned residential areas.

HISTORY

The original collection and treatment systems were constructed in the 1970s and quickly became overloaded. In 1981, an abandoned quarry was converted into an effluent polishing pond to improve treatment capabilities. In 1995, approval was granted to divide the pond into two cells; one aerated-facultative lagoon and one settling pond. Approval was also granted to convert to UV disinfection and to modify the plant's outfall to include a diffuser and extend into deeper water.

The most recent facility upgrade was completed in 2002. This upgrade increased the aeration capacity of the first lagoon cell. This, in turn, more than doubled the plant's treatment capacity.

COLLECTION SYSTEM STATUS

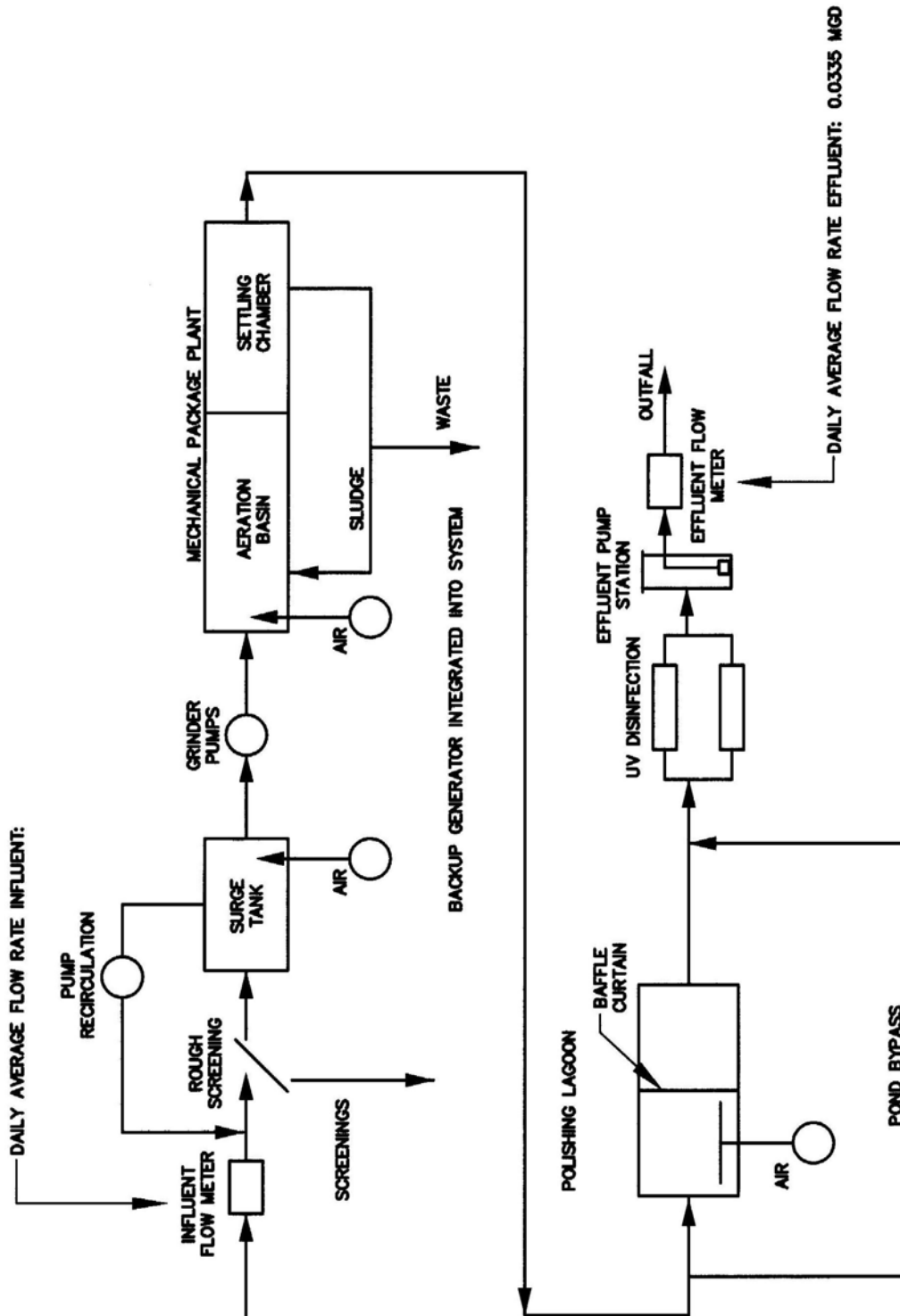
The collection system consists of two main trunk lines serving the hotel and marina area and the condominium area. One lift station (pump station #1) pumps flow from the marina area into one of the main trunk lines. Another lift station (pump station #2) collects flow from both main lines for transfer to the treatment plant.

TREATMENT PROCESSES

The general process flow for the current facility is shown in the following diagram. The plant consists of influent pumping, flow equalization, extended aeration activated sludge treatment, effluent polishing, and UV disinfection.

Headworks: Flow from pump station #2 enters through a Parshall flume and is metered with an ultrasonic level meter. The waste water then flows through coarse screening as it enters an aerated surge tank. Although the aeration allows for limited biological treatment activity in the surge tank, the primary goal of the air is to provide mixing necessary to keep solids in suspension.

Extended Aeration: Paced flow is transferred from the surge tank to the extended aeration basin by grinder pumps. The extended air package plant consists of an aerated basin for initial biological treatment, followed by a settling chamber.



PLANT SCHEMATIC AND PROCESS DIAGRAM
 SCALE: NTS

Polishing Lagoon: Supernatant overflow from the extended air settling chamber flows into the aerated portion of the polishing lagoon. The first cell is designed to provide sufficient aeration to ensure aerobic degradation of organic material that is not removed by the activated sludge system. Overflow from the aerated pond flows into a quiescent settling pond for final clarification. The second pond also accepts waste activated sludge flow and acts as a sludge storage/stabilization pond.

Disinfection: Final, clarified wastewater from the settling pond flows through UV disinfection chambers and is collected at the effluent pump station. Effluent is then discharged by gravity feed or pump (depending on tide) through an effluent flow meter to a single outfall.

DISCHARGE OUTFALL

Secondary treated and disinfected effluent is discharged from the facility via outfall #001 into Roche Harbor (an extension of Haro Strait and the Pacific Ocean). The discharge line consists of a four-inch submarine line extending approximately 800 feet offshore (as measured from the ordinary high water line), terminating at a depth of 16 feet MLLW. The outfall is equipped with a two-port diffuser that distributes effluent in opposite directions.

RESIDUAL SOLIDS

The treatment facility removes solids during the treatment of the wastewater at the headworks (grit and screenings) in addition to incidental solids (rags, scum, and other debris) removed as part of the routine maintenance of the equipment. Grit, rags, scum, and screenings are drained and disposed of as solid waste. Biosolids removed from the extended aeration settling basin are transferred to the settling pond for storage and treatment. The sludge layer from the settling pond is periodically dredged and hauled off-site for disposal under a permit from the San Juan County Health District.

PERMIT STATUS

The previous permit for this facility was issued on March 6, 2001. The previous permit placed effluent limitations on 5-day Biochemical Oxygen Demand (BOD₅), Total Suspended Solids (TSS), pH, Fecal Coliform bacteria, and residual chlorine.

An application for permit renewal was submitted to the Department on December 28, 2004, and accepted by the Department on December 29, 2004.

SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT

The facility received its last inspection on September 30, 2003, a compliance inspection with sampling. The inspection team noted concerns with methods used for composite sampling and the lack of a grease management program. Both issues have been addressed. However, one issue noted by the inspection team that has not been addressed involved concern over having proper safety devices installed around open basins.

During the history of the previous permit, the Permittee has generally remained in compliance, based on discharge monitoring reports (DMRs) submitted to the Department and inspections conducted by the Department. However, as noted in the following table, the facility violated limits on minimum plant treatment efficiency and fecal coliform discharge levels on a few occasions. While the recent fecal coliform violations are a cause for concern, it is suspected that the reported values are the result of calculation errors and may not accurately represent true discharge concentrations. The Department will work with the Permittee to ensure accuracy in calculating values reported on DMRs.

Summary of Discharge Violations, Roche Harbor Resort Wastewater Treatment Plant

Date	Location	Parameter	Units	Reported Value	Minimum Limit	Maximum Limit
12/01/2001	Effluent	Average BOD ₅ Percent Removal	Percent	78	85	
01/01/2004	Effluent	Average TSS Percent Removal	Percent	82	85	
07/01/2004	Effluent	Fecal Coliform, Monthly Geometric Mean	#/100 ml	264		200
07/01/2004	Effluent	Fecal Coliform, Weekly Geometric Mean	#/100 ml	680		400
08/01/2004	Effluent	Fecal Coliform, Monthly Geometric Mean	#/100 ml	269		200
08/01/2004	Effluent	Fecal Coliform, Weekly Geometric Mean	#/100 ml	750		400
11/01/2004	Effluent	Fecal Coliform, Weekly Geometric Mean	#/100 ml	910		400
11/01/2004	Effluent	Average TSS Percent Removal	Percent	78	85	

WASTEWATER CHARACTERIZATION

The average monthly concentration of pollutants in the discharge was reported in the NPDES application and in discharge monitoring reports. The effluent is characterized as follows:

Table 1: Wastewater Characterization

<u>Parameter</u>	<u>Concentration</u>
BOD ₅	8 mg/L
TSS	10 mg/l
Fecal Coliform	28/100 ml
pH	7.0 (minimum), 8.9 (maximum)
Temperature (maximum)	63°F (winter), 70°F (summer)
Dissolved Oxygen	6.5 mg/L

PROPOSED PERMIT LIMITATIONS

Federal and State regulations require that effluent limitations set forth in an NPDES permit must be either technology- or water quality-based. Technology-based limitations for municipal discharges are set by regulation (40 CFR 133, and Chapters 173-220 and 173-221 WAC). Water quality-based limitations are based upon compliance with the surface water quality standards (Chapter 173-201A WAC), ground water standards (Chapter 173-200 WAC), sediment quality standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992.) The most stringent of these types of limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances, the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

DESIGN CRITERIA

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria. Design criteria for this treatment facility, taken from the Roche Harbor Resort Wastewater Treatment Facility Engineering Report Amendment (July 2001) prepared by Symonds Consulting Engineers, are as follows:

Table 2: Design Standards for Roche Harbor WWTP.

Parameter	Design Quantity
Monthly average flow (max. month)	0.1296 MGD
Winter Average Daily Flow	0.025 MGD
BOD ₅ influent loading	458 lb/day
TSS influent loading	458 lb/day

TECHNOLOGY-BASED EFFLUENT LIMITATIONS

Municipal wastewater treatment plants are a category of discharger for which technology-based effluent limits have been promulgated by federal and State regulations. These effluent limitations are given in the Code of Federal Regulations (CFR) 40 CFR Part 133 (federal) and in Chapter 173-221 WAC (State). These regulations are performance standards that constitute all known available and reasonable methods of prevention, control, and treatment for municipal wastewater.

The following technology-based limits for pH, fecal coliform, BOD₅, and TSS (taken from Chapter 173-221 WAC) are:

Table 3: Technology-based Limits.

Parameter	Limit
pH	shall be within the range of 6 to 9 standard units.
Fecal Coliform Bacteria	Monthly Geometric Mean = 200 organisms/100 mL Weekly Geometric Mean = 400 organisms/100 mL
BOD ₅ (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
TSS (concentration)	Average Monthly Limit is the most stringent of the following: - 30 mg/L - may not exceed fifteen percent (15%) of the average influent concentration Average Weekly Limit = 45 mg/L
Chlorine	Average Monthly Limit = 0 mg/L Average Weekly Limit = 0 mg/L

The technology-based monthly average limitation of 0 mg/L for chlorine is based on the use of ultraviolet light disinfection. As this technology operates without the addition of chemicals, a discharge limit of zero for disinfection-related chemicals is warranted. In the event that chlorine use is required due to failure of the UV system, the Permittee will be allowed to exceed the zero limit on a short-term basis. Whenever chlorine use is necessary, technology-based chlorine limits derived from standard operating practices will apply. The Water Pollution Control Federation's Chlorination of Wastewater (1976) states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/liter chlorine residual is maintained after fifteen minutes of contact time. See also Metcalf and Eddy, Wastewater Engineering, Treatment, Disposal and Reuse, Fourth Edition, 2003. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/liter chlorine limit on a monthly average basis. According to WAC 173-221-030(11)(b), the corresponding weekly average is 0.75 mg/liter.

The following technology-based mass limits are based on WAC 173-220-130(3)(b) and 173-221-030(11)(b).

Monthly effluent mass loadings (lb/day) for BOD and TSS were calculated based on the maximum monthly design flow and concentration limit as follows:

$$\begin{aligned}\text{Mass limit} &= \text{Design flow} \times \text{Concentration limit} \times \text{Conversion factor} \\ &= 0.1296 \text{ MGD} \times 30 \text{ mg/L} \times 8.34 = 32.4 \text{ lb/day}\end{aligned}$$

The weekly average effluent mass loading is calculated as $1.5 \times \text{monthly loading} = 48.6 \text{ lb/day}$.

SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established surface water quality standards. The Washington State surface water quality standards (Chapter 173-201A WAC) is a State regulation designed to protect the beneficial uses of the surface waters of the State. Water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin-wide total maximum daily loading study (TMDL).

NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's water quality standards for surface waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the water quality standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The State was issued 91 numeric water quality criteria for the protection of human health by the U.S. EPA (EPA, 1992). These criteria are designed to protect humans from cancer and other diseases and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

ANTIDegradation

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when receiving waters are of higher quality than the criteria assigned, the existing water quality shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

The Department has reviewed existing records and is unable to determine if ambient water quality is either higher or lower than the designated classification criteria given in Chapter 173-201A WAC; therefore, the Department will use the designated classification criteria for this water body in the proposed permit. The discharges authorized by this proposed permit should not cause a loss of beneficial uses.

DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Roche Harbor, which is designated as a Class AA marine receiving water in the vicinity of the outfall. Characteristic uses include the following:

water supply (domestic, industrial, agricultural); stock watering; fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation.

Water quality of this class shall markedly and uniformly exceed the requirements for all or substantially all uses.

SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA, 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	7.0 mg/L minimum
Temperature	16 degrees Celsius maximum or incremental increases above background
pH	7.0 to 8.5 standard units
Turbidity	less than 5 NTUs above background
Toxics	No toxics in toxic amounts

MIXING ZONES

The water quality standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic waterbody uses.

Critical ambient conditions, based on values reported in the 1994 Engineering Report: Wastewater Treatment Plant Improvements, Roche Harbor Resort by Northwest Engineering Company, are as follows:

Parameter	Value Used
Depth	16 feet (Mean Lower Low Water)
Water Temperature	13.3°C (assumed constant with depth)
Minimum Current	0.03 m/s
Salinity	28.5 psu (assumed constant with depth)
Critical plant flow for acute conditions	0.1296 MGD (Design flow rate)
Critical plant flow for chronic conditions	0.0752 MGD (Highest maximum daily flow rate reported in NPDES application)

CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC and are defined as follows:

“In oceanic waters, mixing zones, singularly or in combination with other mixing zones, shall not extend in any horizontal direction from the discharge port(s) for a distance greater than three hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water. In oceanic and estuarine waters a zone where acute criteria may be exceeded shall not extend beyond ten percent of the distance established (for overall mixing zones) as measured independently from the discharge port(s).”

Based on the preceding definition, the authorized chronic mixing zone for outfall #001 will be a region extending horizontally 316 feet from each port and vertically to the water surface at MLLW. The acute mixing zone will extend horizontally for a distance of 31.6 feet from each port and vertically to the water surface at MLLW. The approximate configurations of the mixing zones are discussed in Appendix F.

The dilution factors of effluent to receiving water that occur within these zones have been determined at the critical condition by the use of EPA’s Visual Plumes software using UM3 (three-dimensional Updated Merge Model) protocols. As shown in Appendix F, the dilution factors have been determined to be:

	Acute	Chronic
Aquatic Life	218:1	564:1
Human Health, Carcinogen		564:1
Human Health, Non-carcinogen		564:1

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near-field) or at a considerable distance from the point of discharge (far-field). Toxic pollutants, for example, are near-field pollutants—their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

The impacts of dissolved oxygen deficiency, temperature, pH, fecal coliform, chlorine, ammonia, metals, and other toxics were determined as shown below, using the dilution factors described above.

BOD₅--This discharge with technology-based limitations results in a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations will be protective of dissolved oxygen criteria in the receiving water.

Temperature--The impact of the discharge on the temperature of the receiving water was modeled by simple mixing analysis at critical condition. The receiving water temperature at the critical condition is 13.30°C and the effluent temperature is 21.11°C. The predicted resultant temperature at the boundary of the chronic mixing zone is 13.31°C and the incremental rise is 0.01°C.

Under critical conditions there is no predicted violation of the water quality standards for surface waters. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the water quality standards for surface waters.

Fecal Coliform--The numbers of fecal coliform were modeled by simple mixing analysis using the technology-based limit of 400 organisms per 100 ml and a dilution factor of 564:1.

Under critical conditions there is no predicted violation of the water quality standards for surface waters with the technology-based limit. Therefore, the technology-based effluent limitation for fecal coliform bacteria was placed in the proposed permit.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. The volume and origins of wastewater entering this plant suggest there is no reasonable potential for toxic pollutants to exist in toxic amounts in the effluent. Therefore, no water quality-based limits on toxic pollutants are set.

WHOLE EFFLUENT TOXICITY

The water quality standards for surface waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the waste water in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing.

Toxicity caused by unidentified pollutants is not expected in the effluent from this discharge as determined by the screening criteria given in Chapter 173-205 WAC. Therefore, no whole effluent toxicity testing is required in this permit. The Department may require effluent toxicity testing in the future if it receives information that toxicity may be present in this effluent.

HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the State by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the applicant's discharge is unlikely to contain chemicals regulated for human health. The discharge will be reevaluated for impacts to human health at the next permit reissuance.

SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400). The Department has determined through a review of the discharger characteristics and effluent characteristics that this discharge has no reasonable potential to violate the sediment management standards.

GROUND WATER QUALITY LIMITATIONS

The Department has promulgated ground water quality standards (Chapter 173-200 WAC) to protect uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100). This Permittee has no discharge to ground and therefore no limitations are required based on potential effects to ground water.

COMPARISON OF EFFLUENT LIMITS WITH THE EXISTING PERMIT

Parameter	Existing Limit	Proposed Limit
BOD		
Month Average, mg/L	30	30
Month Average, ppd	32.4	32.4
Weekly Average, mg/L	45	45
Weekly Average, ppd	48.6	48.6
TSS		
Month Average, mg/L	30	30
Month Average, ppd	32.4	32.4
Weekly Average, mg/L	45	45
Weekly Average, ppd	48.6	48.6
Fecal Coliform		
Monthly Average	200/100 ml	200/100 ml
Weekly Average	400/100 ml	400/100 ml
pH, allowable range	6.0 - 9.0 Std Units	6.0 - 9.0 Std Units
Total Residual Chlorine		
Monthly Average, mg/L	0.5	N/A [*]
Daily Maximum, mg/L	0.75	N/A [*]

^{*} Under normal operating conditions with UV disinfection, the permit will not contain a limit for total residual chlorine. However, a limit of 0.5 mg/l Monthly Average and 0.75 mg/l Daily Maximum will apply at times when chlorine use is necessary due to UV system failure.

MONITORING REQUIREMENTS

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

Monitoring of sludge quantity and quality is necessary to determine the appropriate uses of the sludge. Sludge monitoring is required by the current State and local solid waste management program and also by EPA under 40 CFR 503.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of discharge, the treatment method, past compliance, significance of pollutants, and cost of monitoring. The required monitoring frequency is consistent with agency guidance given in the current version of Ecology's *Permit Writer's Manual* (July 2004) for activated sludge treatment facilities, with exception to fecal coliform monitoring. Due to recent anomalies in reported fecal coliform values, the minimum sampling frequency will be increased to 3/week.

LAB ACCREDITATION

With the exception of certain parameters, the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*. The laboratory at this facility is not accredited to perform analysis work associated with the monitoring requirements of this permit. All analysis work that requires use of an accredited laboratory is performed by the lab at the Town of Friday Harbor's Wastewater Treatment Facility, which is accredited for general chemistry and biology.

OTHER PERMIT CONDITIONS

REPORTING AND RECORDKEEPING

The conditions of S3 are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

PREVENTION OF FACILITY OVERLOADING

Overloading of the treatment plant is a violation of the terms and conditions of the permit. To prevent this from occurring, RCW 90.48.110 and WAC 173-220-150 require the Permittee to take the actions detailed in proposed permit Requirement S.4 to plan expansions or modifications before existing capacity is reached and to report and correct conditions that could result in new or increased discharges of pollutants. Condition S.4 restricts the amount of flow.

OPERATION AND MAINTENANCE (O&M)

The proposed permit contains Condition S.5 as authorized under RCW 90.48.110, WAC 173-220-150, Chapter 173-230 WAC, and WAC 173-240-080. It is included to ensure proper operation and regular maintenance of equipment, and to ensure that adequate safeguards are taken so that constructed facilities are used to their optimum potential in terms of pollutant capture and treatment.

The proposed permit requires the Permittee to evaluate the adequacy of the current O&M Manual. The review shall determine if the current manual reflects the routine and emergency operation and maintenance procedures of all equipment used at the facility. Should the review identify significant differences, the Permittee will be required to submit a revised manual to the Department for review and approval.

RESIDUAL SOLIDS HANDLING

To prevent water quality problems, the Permittee is required in Special Condition S.7 to store and handle all residual solids (grit, screenings, scum, sludge, and other solid waste) in accordance with the requirements of RCW 90.48.080 and State water quality standards.

The final use and disposal of biosolids from this facility is regulated by U.S. EPA under 40 CFR 503, and by Ecology under Chapter 70.95J RCW and Chapter 173-308 WAC, "Biosolids Management." The disposal of other solid waste is under the jurisdiction of the San Juan County Health Department.

PRETREATMENT

This facility does not accept flow from outside entities and has little potential to be impacted by significant industrial users. Therefore, the standard federal and State requirements pertaining to pretreatment programs are not valid. However, the Permittee is expected to adhere to and enforce best management practices regarding discharges to the collection system any substance that may have detrimental effects on the treatment system. The following are expected to be incorporated into the general operating plans of the resort.

Duty to Enforce Discharge Prohibitions

This provision prohibits the discharge certain types of waste into the sanitary sewer. The first portion of the provision prohibits acceptance of pollutants which cause pass-through or interference. The definitions of pass through and interference are in Appendix B of the fact sheet.

The second portion of this provision prohibits the treatment system from accepting certain specific types of wastes, namely those which are explosive, flammable, excessively acidic, basic, otherwise corrosive, or obstructive to the system. In addition, wastes with excessive BOD, petroleum-based oils, or which result in toxic gases are prohibited to be discharged. The regulatory basis for these prohibitions is 40 CFR Part 403, with the exception of the pH provisions which are based on WAC 173-216-060.

The third portion of this provision prohibits certain types of discharges unless the Permittee receives prior authorization from the Department. The discharges include cooling water in significant volumes, storm water, and other direct inflow sources, and wastewaters significantly affecting system hydraulic loading, which do not require treatment.

Development of Best Management Practices

To prevent the potential for prohibited discharges to the wastewater treatment system, the Permittee will be required to develop and enforce a set of best management practices for all resort operations. The development process shall identify resort operations that have the potential to discharge dangerous substances or substances that may cause bypass or overloading. Once identified, operational policies shall be established and implemented to prevent prohibited discharges. A one-time submission of established BMPs will be required.

Requirements for Routine Identification of Potential Sources of Prohibited Discharges

The Permittee is expected to take continuous measures to identify new resort operations and practices that may lead to prohibited discharges into the wastewater treatment system. Upon identification of potential sources of prohibited discharges, the Permittee shall develop and implement best management practices guidelines that minimize the potential for prohibited discharges from that source.

PLANT SAFETY AUDIT

Proposed permit Condition S.8 requires the Permittee to conduct a safety evaluation of the wastewater treatment facility. This requirement is in accordance with general Condition G.6 of the proposed permit, which requires the Permittee to comply with all other applicable laws and statutes. A compliance inspection conducted by the Department in 2003 noted concern over the lack of railings around the aeration basin and clarifier. A technical assistance visit in February 2005 revealed that walking surfaces were not protected from slip hazards during frosty/icy weather. Both issues raise concern about the facility being operated and maintained according to State and federal laws regarding worker safety.

The safety evaluation shall be conducted by an individual or organization with a background in assessing worker safety in industrial processes similar to municipal wastewater treatment plants. The Permittee will be required to submit a copy of the findings from the evaluation, along with a schedule for making necessary safety improvements.

GENERAL CONDITIONS

General Conditions are based directly on State and federal law and regulations and have been standardized for all individual municipal NPDES permits issued by the Department.

PERMIT ISSUANCE PROCEDURES

PERMIT MODIFICATIONS

The Department may modify this permit to impose numerical limitations, if necessary, to meet water quality standards, sediment quality standards, or ground water standards, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended State or federal regulations.

RECOMMENDATION FOR PERMIT ISSUANCE

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this permit be issued for five (5) years.

REFERENCES FOR TEXT AND APPENDICES

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.
1991. Technical Support Document for Water Quality-based Toxics Control. EPA/505/2-90-001.
1988. Technical Guidance on Supplementary Stream Design Conditions for Steady State Modeling. USEPA Office of Water, Washington, D.C.
1985. Water Quality Assessment: A Screening Procedure for Toxic and Conventional Pollutants in Surface and Ground Water. EPA/600/6-85/002a.
1983. Water Quality Standards Handbook. USEPA Office of Water, Washington, D.C.

Metcalf and Eddy.

2003. Wastewater Engineering, Treatment, Disposal, and Reuse. Fourth Edition.

Northwest Engineering Company

1994. Engineering Report: Wastewater Treatment Plant Improvements, Roche Harbor Resort.
1994. Outfall Analysis: Engineering Report, Wastewater Treatment Plant Improvements, Roche Harbor Resort.

Symonds Consulting Engineers

2001. Roche Harbor Resort Wastewater Treatment Facility Engineering Report Amendment.

Washington State Department of Ecology.

Laws and Regulations (<http://www.ecy.wa.gov/laws-rules/index.html>)

Permit and Wastewater Related Information
(<http://www.ecy.wa.gov/programs/wq/wastewater/index.html>)

Washington State Department of Ecology.

- 2004 Permit Writer's Manual. Publication Number 92-109

Water Pollution Control Federation.

1976. Chlorination of Wastewater.

APPENDIX A—PUBLIC INVOLVEMENT INFORMATION

The Department has tentatively determined to reissue a permit to the applicant listed on page one of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public Notice of Application (PNOA) was published on January 19, 2005, and January 26, 2005, in the *Journal of the San Juans* to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department published a Public Notice of Draft (PNOD) on May 18, 2005, in the *Journal of the San Juans* to inform the public that a draft permit and fact sheet were available for review. Interested persons were invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents were available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below.

Written comments were mailed to:

Water Quality Permit Coordinator
Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30)-day comment period to the address above. The request for a hearing shall indicate the interest of the party and the reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by telephone, (425) 649-7037, by e-mail to shmc461@ecy.wa.gov, or by writing to the address listed above.

This permit and fact sheet were written by Shawn McKone, Municipal Facility Manager.

APPENDIX B—GLOSSARY

Acute Toxicity--The lethal effect of a pollutant on an organism that occurs within a short period of time, usually 48 to 96 hours.

AKART--An acronym for “all known, available, and reasonable methods of prevention, control, and treatment.”

Ambient Water Quality--The existing environmental condition of the water in a receiving water body.

Ammonia--Ammonia is produced by the breakdown of nitrogenous materials in waste water. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect waste water.

Average Monthly Discharge Limitation --The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month (except in the case of fecal coliform). The daily discharge is calculated as the average measurement of the pollutant over the day.

Average Weekly Discharge Limitation--The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar week divided by the number of daily discharges measured during that week. The daily discharge is calculated as the average measurement of the pollutant over the day.

Best Management Practices (BMPs)--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

BOD₅--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD₅ is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

Bypass--The intentional diversion of waste streams from any portion of a treatment facility.

CBOD₅--The quantity of oxygen utilized by a mixed population of microorganisms acting on the nutrients in the sample in an aerobic oxidation for five days at a controlled temperature of 20 degrees Celsius, with an inhibitory agent added to prevent the oxidation of nitrogen compounds. The method for determining CBOD₅ is given in 40 CFR Part 136.

Chlorine--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

Chronic Toxicity--The effect of a pollutant on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

Clean Water Act (CWA)--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

Combined Sewer Overflow (CSO)--The event during which excess combined sewage flow caused by inflow is discharged from a combined sewer, rather than conveyed to the sewage treatment plant because either the capacity of the treatment plant or the combined sewer is exceeded.

Compliance Inspection - Without Sampling--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.

Compliance Inspection - With Sampling--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the percent removal requirement. Additional sampling may be conducted.

Composite Sample--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing a minimum of four discrete samples. May be "time-composite" (collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots).

Construction Activity--Clearing, grading, excavation, and any other activity which disturbs the surface of the land. Such activities may include road building; construction of residential houses, office buildings, or industrial buildings; and demolition activity.

Continuous Monitoring--Uninterrupted, unless otherwise noted in the permit.

Critical Condition--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

Dilution Factor--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

Engineering Report--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

Fecal Coliform Bacteria--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

Grab Sample--A single sample or measurement taken at a specific time or over as short a period of time as is feasible.

Industrial User--A discharger of wastewater to the sanitary sewer which is not sanitary wastewater or is not equivalent to sanitary wastewater in character.

Industrial Wastewater--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

Infiltration and Inflow (I/I)--"Infiltration" means the addition of ground water into a sewer through joints, the sewer pipe material, cracks, and other defects. "Inflow" means the addition of precipitation-caused drainage from roof drains, yard drains, basement drains, street catch basins, etc., into a sewer.

Interference--A discharge which, alone or in conjunction with a discharge or discharges from other sources, both:

Inhibits or disrupts the POTW, its treatment processes or operations, or its sludge processes, use or disposal; and

Therefore is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation) or of the prevention of sewage sludge use or disposal in compliance with the following statutory provisions and regulations or permits issued thereunder (or more stringent State or local regulations): Section 405 of the Clean Water Act, the Solid Waste Disposal Act (SWDA) [including Title II, more commonly referred to as the Resource Conservation and Recovery Act (RCRA), and including State regulations contained in any State sludge management plan prepared pursuant to Subtitle D of the SWDA], sludge regulations appearing in 40 CFR Part 507, the Clean Air Act, the Toxic Substances Control Act, and the Marine Protection, Research and Sanctuaries Act.

Major Facility--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Maximum Daily Discharge Limitation--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

Method Detection Level (MDL)--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

Minor Facility--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

Mixing Zone--A volume that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in State regulations (Chapter 173-201A WAC).

National Pollutant Discharge Elimination System (NPDES)--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and federal laws.

Pass-through--A discharge which exits the POTW into waters of the State in quantities or concentrations which, alone or in conjunction with a discharge or discharges from other sources, is a cause of a violation of any requirement of the POTW's NPDES permit (including an increase in the magnitude or duration of a violation), or which is a cause of a violation of State water quality standards.

pH--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

Potential Significant Industrial User--A potential significant industrial user is defined as an Industrial User which does not meet the criteria for a Significant Industrial User, but which discharges wastewater meeting one or more of the following criteria:

- a. Exceeds 0.5 % of treatment plant design capacity criteria and discharges <25,000 gallons per day or;
- b. Is a member of a group of similar industrial users which, taken together, have the potential to cause pass through or interference at the POTW (e.g. facilities which develop photographic film or paper, and car washes).

The Department may determine that a discharger initially classified as a potential significant industrial user should be managed as a significant industrial user.

Quantitation Level (QL)--A calculated value five times the MDL (method detection level).

Significant Industrial User (SIU)--

- 1) All industrial users subject to Categorical Pretreatment Standards under 40 CFR 403.6 and 40 CFR Chapter I, Subchapter N and;
- 2) Any other industrial user that: discharges an average of 25,000 gallons per day or more of process wastewater to the POTW (excluding sanitary, noncontact cooling, and boiler blow-down wastewater); contributes a process wastestream that makes up 5 percent or more of the average dry weather hydraulic or organic capacity of the POTW treatment plant; or is designated as such by the Control Authority* on the basis that the industrial user has a reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement (in accordance with 40 CFR 403.8(f)(6)).

Upon finding that the industrial user meeting the criteria in paragraph 2, above, has no reasonable potential for adversely affecting the POTW's operation or for violating any pretreatment standard or requirement, the Control Authority* may at any time, on its own initiative or in response to a petition received from an industrial user or POTW, and in accordance with 40 CFR 403.8(f)(6), determine that such industrial user is not a significant industrial user.

*The term "Control Authority" refers to the Washington State Department of Ecology in the case of nondelegated POTWs or to the POTW in the case of delegated POTWs.

State Waters--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, wetlands, and all other surface waters and watercourses within the jurisdiction of the State of Washington.

Stormwater--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

Technology-based Effluent Limit--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

Total Suspended Solids (TSS)--Total suspended solids are the particulate materials in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

Upset--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

Water Quality-based Effluent Limit--A limit on the concentration or mass of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

APPENDIX C—TECHNICAL CALCULATIONS

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov/programs/wq/wastewater/index.html>

APPENDIX D—RESPONSE TO COMMENTS

Comment from Roche Harbor Resort:

- 1. Increase in operator certification rating**—The Resort requests a 6-month extension on the plant operator upgrade requirement to allow time for the operators to schedule and complete any necessary training and testing.

Response: The Certified Operator requirement in Section S5.A of the final permit will be revised to allow for a one-year compliance schedule for the upgrade in operator certification. By no later than July 1, 2006, at least one plant operator will be required to be certified as a Group II operator. During the interim the plant will be allowed to continue operation with Group I operators.

APPENDIX E—DMR SUMMARY DATA

The following table and graphs summarize data reported to the Department in monthly Discharge Monitoring Reports from April 2001 to February 2005 for the Roche Harbor Wastewater Treatment Plant.

ROCHE HARBOR RESORT WASTEWATER TREATMENT PLANT

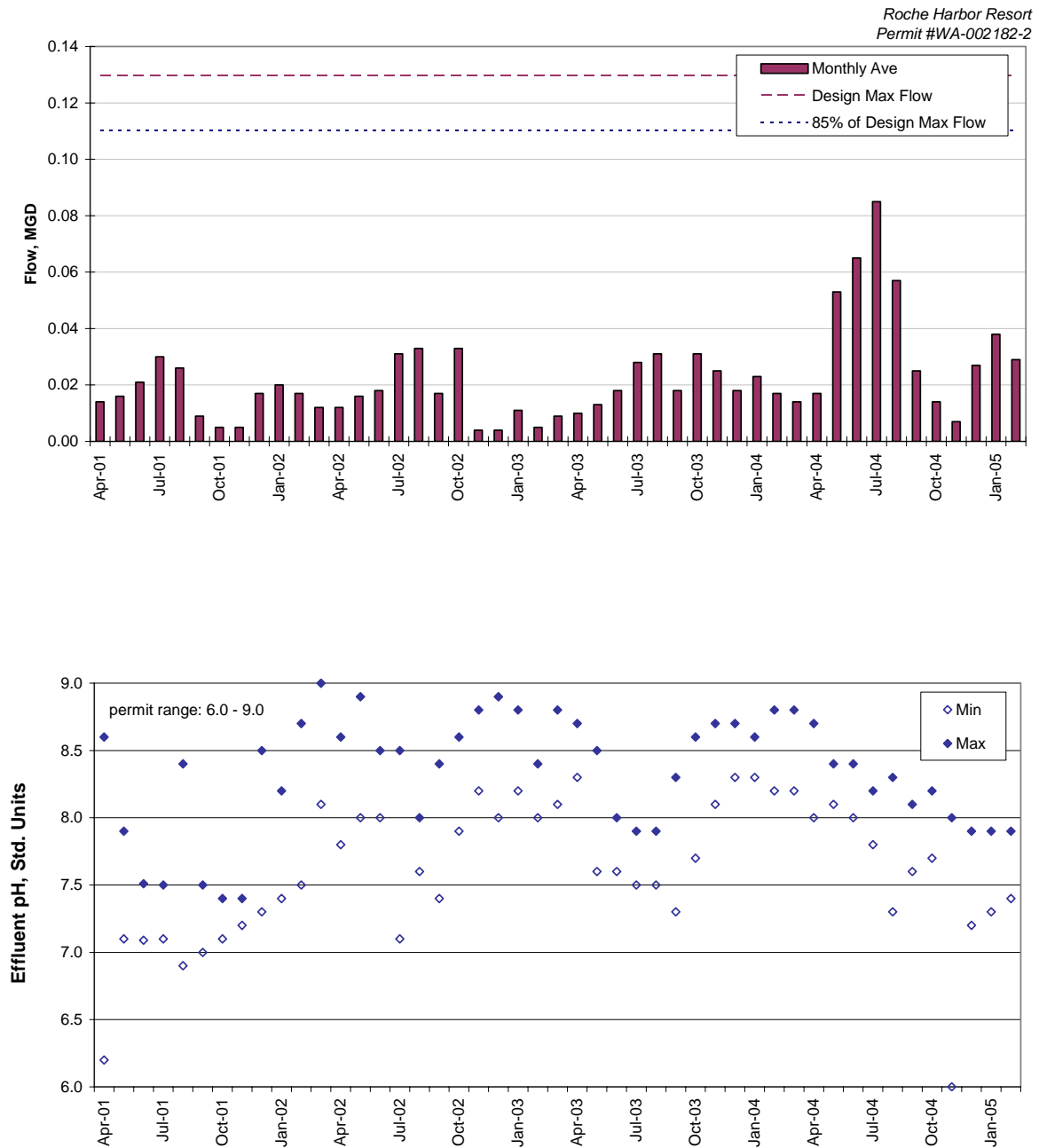
Discharge Monitoring Data, 2001-2005

Facility: Roche Harbor Resort
Permit No: WA-002182-2

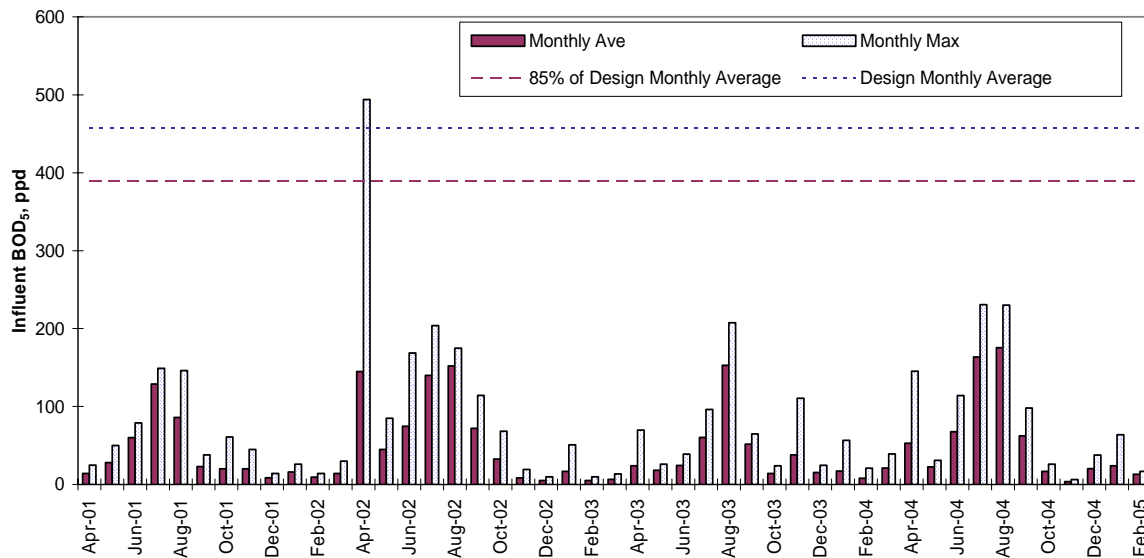
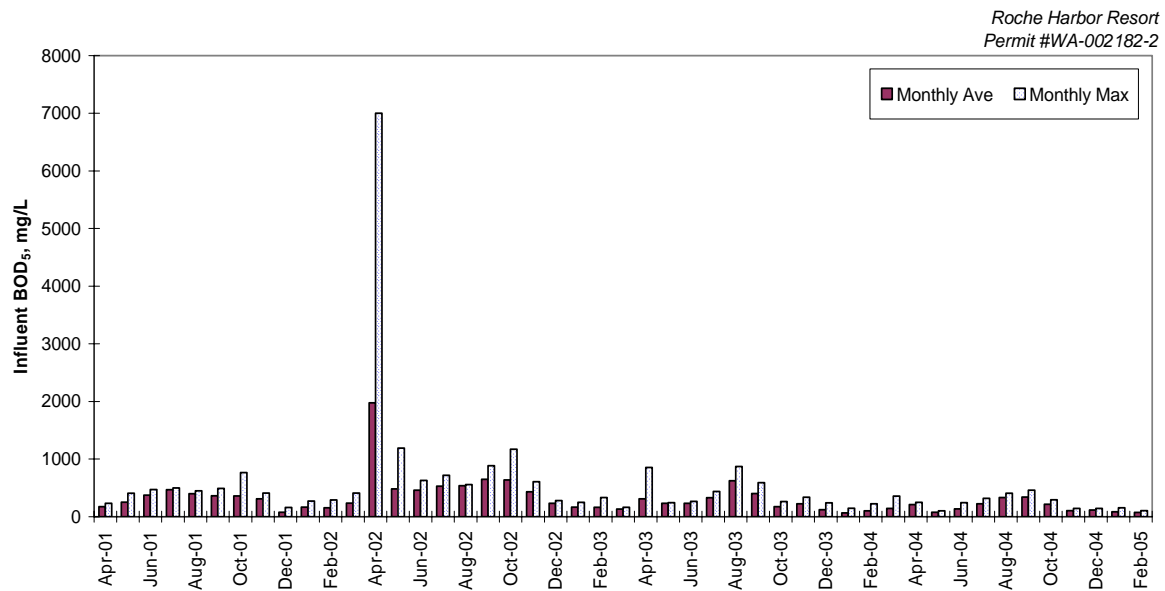
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Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max	Monthly Min	Monthly Avg	Monthly Max

approaching design limits (85%)
exceeds permit/design limits

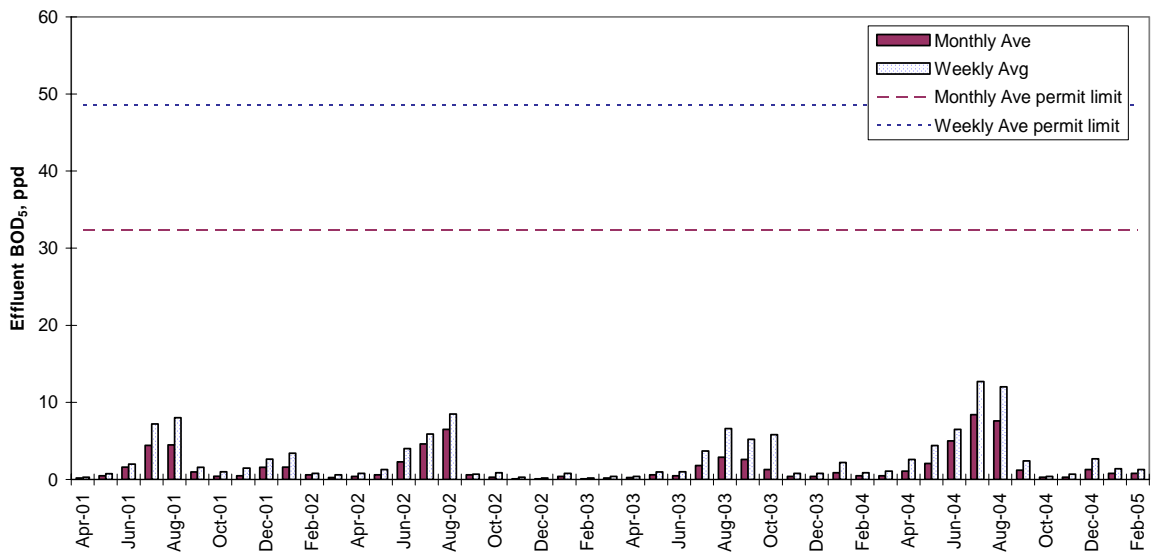
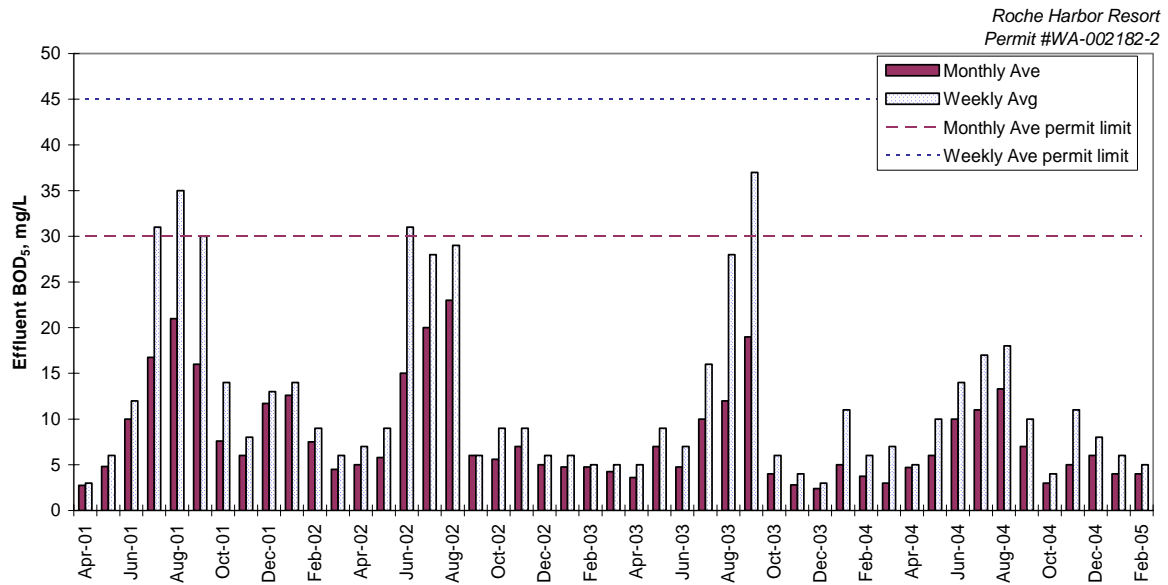
Discharge Monitoring Data, Flow and Effluent pH, 2001-2005



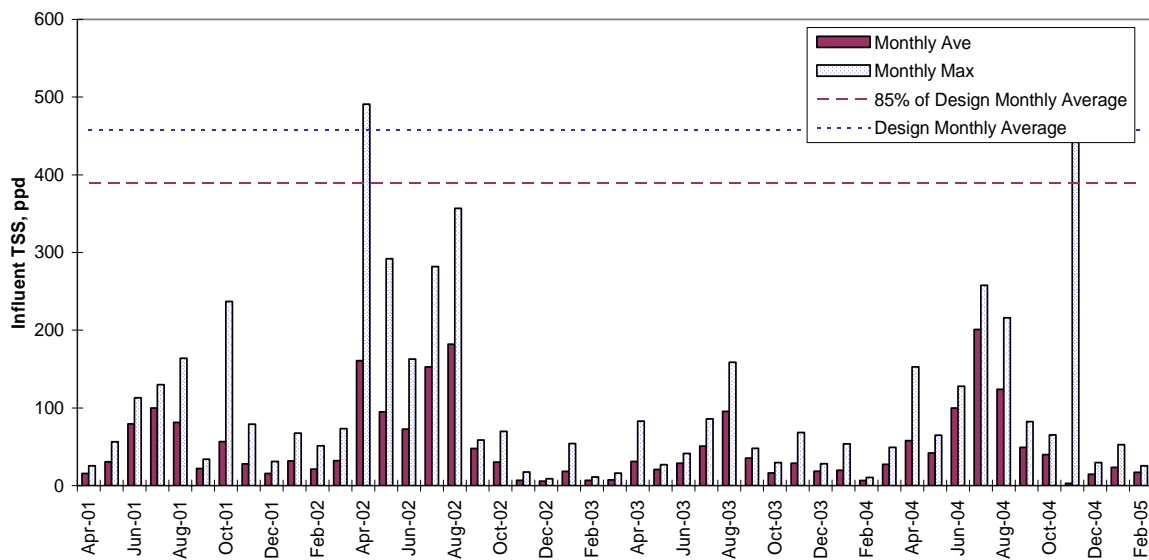
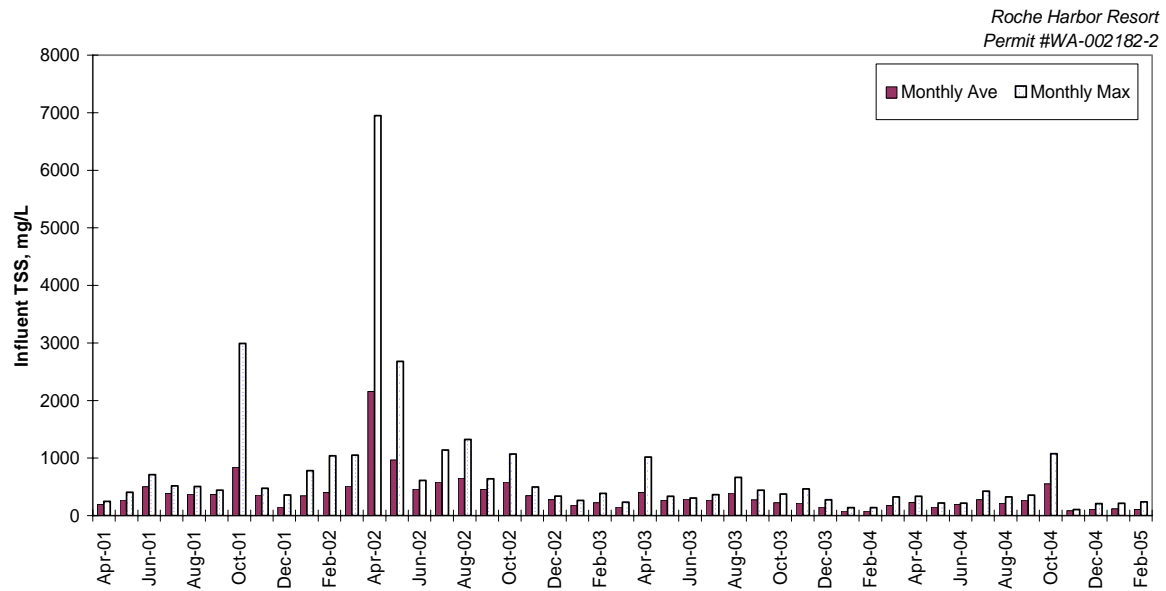
Discharge Monitoring Data, Influent BOD₅, 2001-2005



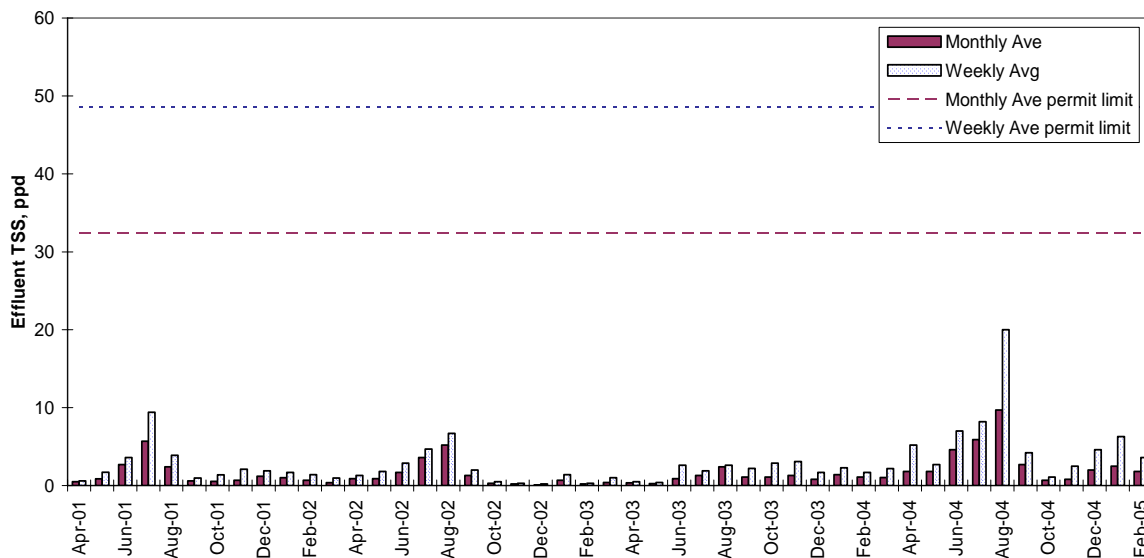
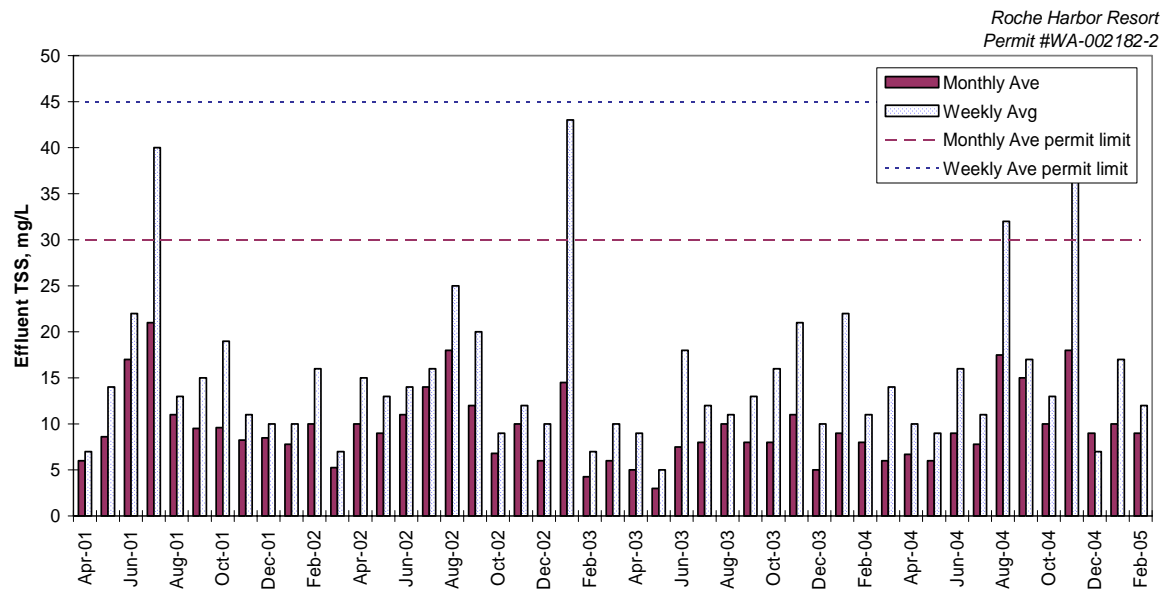
Discharge Monitoring Data, Effluent BOD₅, 2001-2005



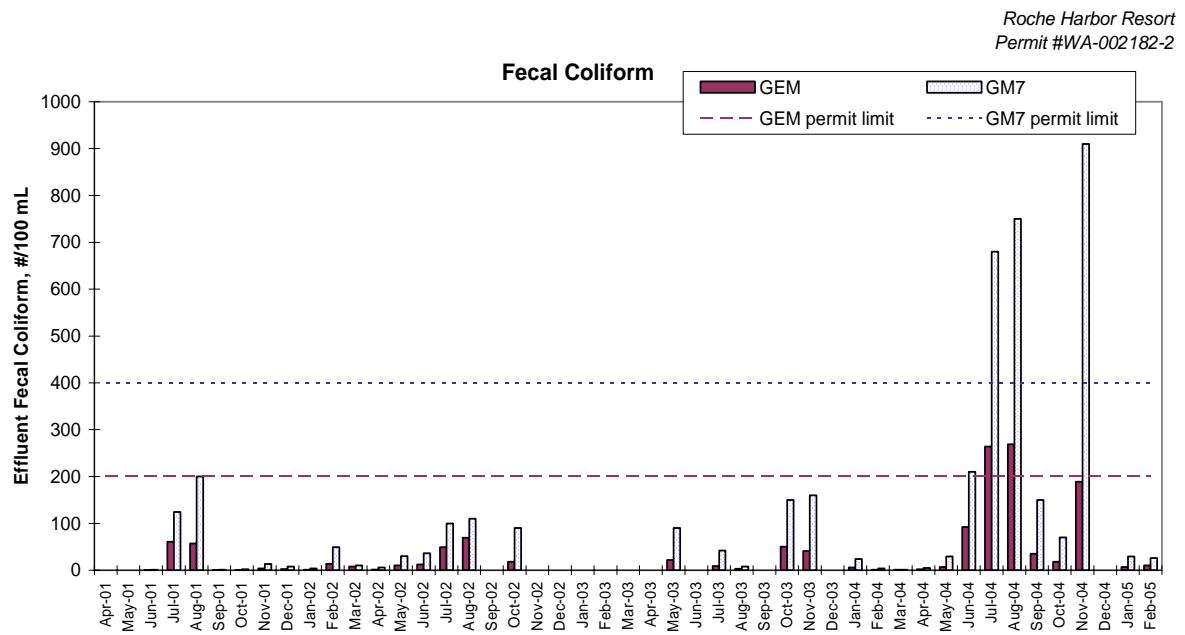
Discharge Monitoring Data, Influent TSS, 2001-2005



Discharge Monitoring Data, Effluent TSS, 2001-2005



Discharge Monitoring Data, Effluent Fecal Coliform, 2001-2005



APPENDIX F—OUTFALL DILLUTION ANALYSIS

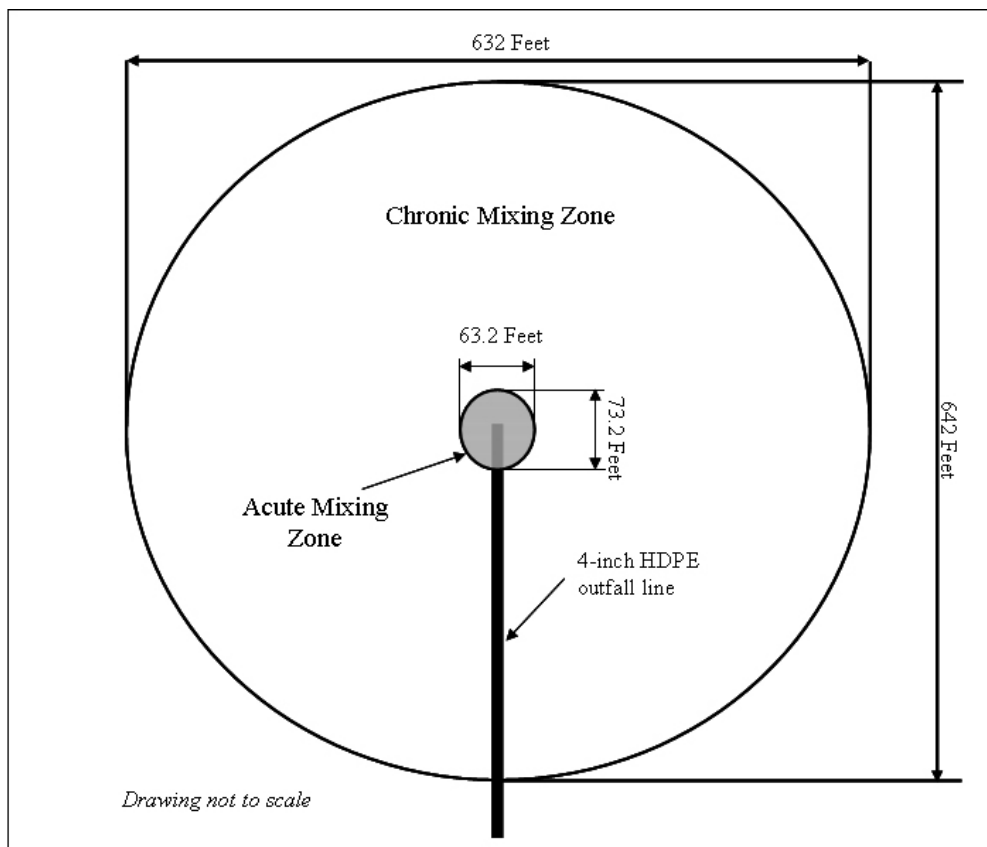
Mixing Zone Size

Mixing zones are authorized for compliance with water quality standards in accordance with restrictions established in Chapter 173-201A-100 WAC. Restrictions include geometric limitations based on the size and configuration of the outfall diffuser, as well as dimensions of the receiving water body. As defined in 173-201A-100 (c) WAC, the maximum chronic mixing zone size is limited as follows:

“Shall not extend in any horizontal direction from the discharge port(s) for a distance greater than three hundred feet plus the depth of water over the discharge port(s) as measured during mean lower low water (MLLW)”

Given the MLLW depth of 16 feet, the chronic mixing zone for the facility’s outfall will be allowed to have a maximum radius of 316 feet from any point along the length of the diffuser. Based on a total diffuser length of 10 feet, the allowable chronic mixing zone will be elliptical in shape, with total length of: $10 \text{ ft} + 2 \times 316 \text{ ft} = 642 \text{ ft}$; width will be $2 \times 316 \text{ ft} = 632 \text{ ft}$. The zone of acute criteria exceedence can occupy a region with dimensions that are 10% of the chronic mixing zone area dimensions. Therefore, the acute mixing zone will have an allowable length of 73.2 ft ($2 \times 31.6 \text{ ft} + 10 \text{ ft}$) and an allowable width of 63.2 ft. The sizes of both mixing zones are approximated in the following illustration.

Outfall Mixing Zone Configuration



Dilution Modeling, Outfall #001

Dilution modeling of the outfall was based on data supplied in the 1994 Outfall Analysis. Design parameters used for the evaluation are summarized in the following table.

Parameter	Value
Number of ports	2
Spacing between ports	10 feet
Port diameter	1.25 inches
Discharge angle	10 degrees above horizontal
Discharge elevation	2 inches above bottom
Port depth	16 feet MLLW

Modeling evaluated plume behavior with summer ambient receiving water characteristics and at normal, peak and design wastewater flows. As indicated in the following data sets, worst case mixing conditions will result in dilutions ratios of 564:1 (chronic) and 218:1 (acute).

Summer conditions, normal wastewater flow												
Case 1; ambient file Z:\WWTP\Roche Harbor Resort\permit 2005\Outfall Eval.001.db; Diffuser table record 1: -----												
Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-sp	Far-dir	Disprsn			
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2			
0	0.03	-90	28.5	13.3	0	0	0.03	180	0.0003			
5	0.03	-90	28.5	13.3	0	0	0.03	180	0.0003			
P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChrmcMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(in)	(deg)	(N-deg)	()	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(ppm)
1.25	2	10	215	2	10	32	320	16	0.0335	0.05	70	100
Froude number: 10.88												
Step	Depth	Amb-cur	P-dia	Incrmnt	Polutnt	4/3Eddy	P-speed	Dilutn	x-posn	y-posn		
	(ft)	(m/s)	(in)	(s)	(ppm)	(ppm)	(m/s)	(l)	(ft)	(ft)		
0	16	0.03	1.25	3600	100	100	0.927	1	0	0.0		
100	15.65	0.03	7.904	3600	13.8	13.8	0.162	7.102	-0.642	-1.022;		
200	12.52	0.03	30.33	3600	1.905	1.905	0.0804	51.31	-1.707	-3.805;		
300	2.849	0.03	100.2	3600	0.263	0.263	0.0534	371.6	-2.346	-10.27;		
301	2.702	0.03	101.4	3600	0.258	0.258	0.0532	379	-2.351	-10.38;		
309	1.337	0.03	113.1	3600	0.22	0.22	0.052	444.1	-2.391	-11.42;		
Plumes not merged, Brooks method may be overly conservative.												
4/3 Power Law. Farfield dispersion based on wastefield width of 5.37 m												
conc	dilutn	width	distnce	time								
(ppm)		(m)	(m)	(hrs)	(ppm)	(s-1)	(m/s)	(m0.67/s2)				
1.36E-04	931.2	34.44	97.54	0.87	0	0	0.03	3.00E-04				

Summer conditions, peak wastewater flow												
Case 1; ambient file Z:\WWTP\Roche Harbor Resort\permit 2005\Outfall Eval.001.db; Diffuser table record 2: -----												
Depth	Amb-cur	Amb-dir	Amb-sal	Amb-tem	Amb-pol	Decay	Far-sp	Far-dir	Disprsn			
m	m/s	deg	psu	C	kg/kg	s-1	m/s	deg	m0.67/s2			
0	0.03	-90	28.5	13.3	0	0	0.03	180	0.0003			
5	0.03	-90	28.5	13.3	0	0	0.03	180	0.0003			
P-dia	P-elev	V-angle	H-angle	Ports	Spacing	AcuteMZ	ChrmcMZ	P-depth	Ttl-flo	Eff-sal	Temp	Polutnt
(in)	(in)	(deg)	(N-deg)	(l)	(ft)	(ft)	(ft)	(ft)	(MGD)	(psu)	(F)	(ppm)
1.25	2	10	215	2	10	32	320	16	0.0752	0.05	70	100
Froude number: 24.42												
Step	Depth	Amb-cur	P-dia	Incrmnt	Polutnt	4/3Eddy	P-speed	Dilutn	x-posn	y-posn		
	(ft)	(m/s)	(in)	(s)	(ppm)	(ppm)	(m/s)	(l)	(ft)	(ft)		
0	16	0.03	1.25	3600	100	100	2.081	1	0	0.0		
100	15.72	0.03	8.508	3600	13.8	13.8	0.313	7.102	-0.767	-1.154;		
200	12.26	0.03	41.09	3600	1.905	1.905	0.0982	51.31	-3.116	-5.899;		
279	2.177	0.03	107.7	3600	0.399	0.399	0.0685	245.2	-4.621	-12.67;		
284	1.067	0.03	115.2	3600	0.361	0.361	0.0676	270.7	-4.706	-13.37;		
Plumes not merged, Brooks method may be overly conservative.												
4/3 Power Law. Farfield dispersion based on wastefield width of 5.42 m												
conc	dilutn	width	distnce	time								
(ppm)		(m)	(m)	(hrs)	(ppm)	(s-1)	(m/s)	(m0.67/s2)				
3.73E-04	564	34.24	97.									